

Ch. 23 day 2

p. 556

#17- conditions are met (assume normal pop.)
add (d) Interpret 95% confidence

#30- assume conditions met
add the following:
(g) Interpret Type I error
(h) Interpret Type II error
(i) Interpret Power

17) $n = 23$ $df = 22$ $\bar{x} = 756.22$ $s = 107.12$

conditions met with assumption of normal population
t-distribution --> 1 sample t-interval

$$756.22 \pm (2.074)(107.12/\sqrt{23}) = (709.90, 802.54)$$

(b) We are 95% confident that the average speed of light is between 709.90 and 802.54 km/sec.

(c) assumption of normal population had to be made in order to continue.

(d) 95% of all random samples of 23 trials of the experiment will produce confidence intervals that will catch the true average speed of light.

OR In repeated samples of 23 trials of the expt, 95% of the intervals created will catch the true average speed of light.

30) $\mu = 26$ $n = 50$ $df = 49$ $\bar{x} = 25.02$ $s = 4.83$

(a) $H_0: \mu = 26$
 $H_a: \mu < 26$

(b) Conditions met --> t-distribution --> 1 sample t Test

(c) $t_{49}(26, 0.6831)$

$$(d) t = \frac{25.02 - 26}{4.83/\sqrt{50}} = -1.435$$

$$P(t < -1.435 \mid df = 49) = 0.07886$$

(e) There is a 7.886% chance of getting a sample where the average fuel economy is 25.02 mpg or less, if the true average fuel economy is 26 mpg.

(f) We fail to reject our H_0 b/c the p-value of $0.07886 > \alpha = 0.05$. We have insufficient evidence that the true average fuel economy less than 26 mpg.

(g) Type I error = Concluding that the average fuel economy is less than 26 mpg, when it is not.

(h) Type II error = Concluding that the average fuel economy is not less than 26 mpg, when really it is less.

(i) Power = The probability of concluding that the average fuel economy is less than 26 mpg, and it really is.

Complete practice problems from notes #3 & 4:

3. Suppose that in a sample of 36 bottles from a certain bottling machine, the machine filled the bottles with an average of 16.1 ounces of cola. The sample had a standard deviation of 0.11 ounces. Give a 90% confidence interval for the mean number of ounces. Interpret this interval.

4. The average stay in days for nongovernmental not-for-profit hospitals is given to be 7.2 days. A sample of 50 such hospitals was selected to test the hypothesis that the average stay is different from the national average. The data collected is below. Is this sufficient evidence to reject the null hypothesis? Use $\alpha = 0.01$.

5	6	10	11	6	8	9	2	8	9
6	7	3	13	5	4	10	7	9	4
8	5	4	4	8	5	2	3	6	6
3	8	7	2	7	6	9	8	2	2
4	9	9	1	7	7	1	4	5	1

#3 in notes:

$n = 36$ $\bar{x} = 16.1$ $s = 0.11$ $df = 35$ 90% conf.

Conditions:

- | | |
|---------------------------------|--|
| 1) SRS | 1) assumed random |
| 2) $pop \geq 10n$ | 2) there are more than 360 bottles of soda |
| 3) normal pop
or $n \geq 30$ | 3) $n = 36 \geq 30$ |

Conditions met => use Student's t-distribution => 1-sample t-Interval

= (16.069, 16.131)

We are 90% confident that the true average amount of cola in a bottle is between 16.069 and 16.131 ounces.

#4 in notes:

$n = 50$ $\bar{x} = 5.9$ $s = 2.859$ $df = 49$ $\alpha = 0.01$

Conditions:

- | | |
|---------------------------------|---|
| 1) SRS | 1) assumed random |
| 2) $pop \geq 10n$ | 2) there are more than 500 hospital stays |
| 3) normal pop
or $n \geq 30$ | 3) $n = 50 \geq 30$ |

Conditions met => use Student's t-distribution => 1-sample t-Test

$$= -3.215$$

$$2 * P(t < -3.215 | df = 49) = 0.0023$$

- We reject H_0 b/c p-value of $0.0023 < \alpha = 0.01$.
- We have sufficient evidence that the true average length of a hospital stay is not 7.2 days.